ORAL

TCT-56

Early Extracorporeal Membrane Oxygenator-Assisted Primary Percutaneous Coronary Intervention Improved 30-Day Clinical Outcomes in Patients with STEMI Complicated with Profound Cardiogenic Shock

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Objectives: This study tested the hypothesis that early extracorporeal membrane oxygenator (ECMO) offered additional benefits in improving 30-day outcomes in patients with acute ST-segment elevation myocardial infarction (STEMI) complicated with profound cardiogenic shock undergoing primary percutaneous coronary intervention (PCI).
Methods: Between May 1993 and July 2002, 920 acute STEMI patients underwent primary PCI. Of these patients, 12.5% (115) with cardiogenic shock were enrolled into this study (Group 1). Between August 2002 and December 2009, 1650 acute STEMI patients underwent primary PCI. Of these patients, 13.3% (219) complicated with cardiogenic shock were enrolled (Group 2).
Results: Incidence of profound shock [defined as systolic blood pressure remained ≤ 75 mmHg after intra-aortic balloon pump and inotropic agent supports] was similar in both groups (21.7% vs. 21.0%, p>0.5). ECMO support, which was only available for group 2 patients, was performed at catheterization room. The results demonstrated that final thrombolysis in myocardial infarction (TIMI)-3 flow in infarct-related artery was similar between the two groups (p=0.678). However, total 30-day mortality and the mortality of profound shock patients were lower in group 2 than in group 1 (all p <0.04). Additionally, the hospital-survival time was remarkably longer in group 2 than in group 1 patients (p=0.0005). Moreover, multivariate analysis demonstrated that unsuccessful reperfusion, presence of advanced congestive heart failure, profound shock, and age were independent predictors of 30-day mortality (all p<0.02).
Conclusion: Early ECMO-assisted primary PCI improved 30-day outcomes in STEMI patients complicated with profound cardiogenic shock.

Invasive Imaging

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(Abstract Nos 57-64)

TCT-57

Positive Remodeling is Associated with More Vulnerable Plaque Characteristics and More No-Reflow and Tissue Prolapse after Percutaneous Coronary Intervention Compared with Intermediate or Negative Remodeling in Saphenous Vein Graft Lesions

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Background: Plaque characteristics and acute post-percutaneous coronary intervention (PCI) outcome according to the remodeling pattern in saphenous vein graft (SVG) lesions were not fully assessed.
Objectives: We evaluated pre- and post-PCI intravascular ultrasound (IVUS) images of 311 SVG lesions and compared IVUS findings and acute PCI outcomes between lesions with positive remodeling (PR, n=113) and those with intermediate/negative remodeling (IR/NR, n=198).
Methods: Remodeling index was the ratio of the lesion site SVG area to the mean of the proximal and distal references [PR: remodeling index (RI) >1.05, IR: 0.95≤RI≤1.05, NR: IR<0.95)]. Hypoechoic plaque was less bright than the adventitia, a ruptured plaque contained a cavity that communicated with the lumen with an overlying residual fibrous cap fragment, and an intraluminal mass had a layered lobulated appearance, evidence of blood flow (microchannels) within the mass, and speckling or scintillation (similar to thrombus in native coronary arteries). No-reflow was defined as post-PCI Thrombolysis In Myocardial Infarction (TIMI) grade 0, 1, or 2 flow in the absence of mechanical obstruction. Tissue prolapse (TP) was defined as tissue extrusion through the stent strut post-PCI, and the volume of TP was calculated by subtracting lumen volume from stent volume.
Results: The presence of hypoechoic plaque (59% vs. 36%, P=0.001), plaque rupture (26% vs. 16%, P=0.042), multiple plaque rupture (12% vs. 5%, P=0.020), and an intraluminal mass (59% vs. 41%, P=0.002) were more common in PR lesions than in IR/NR lesions. Plaque cavity area was greater in PR lesions compared with IR/NR lesions (0.83±1.43 mm^2 vs. 0.42±1.07 mm^2, P=0.009). Post-PCI no-reflow (19% vs. 9%, P=0.019) and post-PCI TP (53% vs. 27%, P<0.001) were observed more frequently, and TP volume was significantly greater (0.86±1.30 mm^3 vs. 0.34±0.74 mm^3, P<0.001) after PCI for PR lesions than for IR/NR lesions. PR was the independent predictor of post-PCI no-reflow [odds ratio (OR)=2.58; 95% CI 1.25-5.64, P=0.040] and post-stenting TP (OR=2.45; 95% CI 1.46-5.41, P=0.045).
Conclusions: SVG lesions with PR have more vulnerable plaque characteristics and are associated with more no-reflow and TP after PCI compared with those with IR/NR.

TCT-58

Can Angiographic Late Loss Predict the Neointimal Coverage Of Stent Strut On Optical Coherence Tomography After Drug-eluting Stent Implantation?

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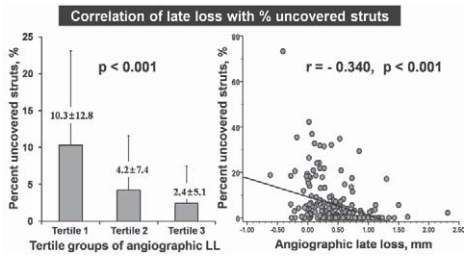
Background: There have been no data regarding the correlations between angiographic late loss (LL), which is considered one of the most important endpoints to evaluate the efficacy of drug-eluting stents (DES), and incomplete neointimal coverage of struts, regarded as the most powerful predictor for DES thrombosis. We evaluated the correlations of angiographic LL with incomplete neointimal coverage on optical coherence tomography (OCT) after DES implantation.
Methods: From Yonsei OCT registry, a total of 219 lesions without restenosis after DES implnatation were grouped into tertiles according to angiographic LL: tertile 1 (LL≤0.26mm; 73 lesions,), tertile 2 (0.26-0.58mm; 73 lesions), and tertile 3 (≥0.59mm, 73 lesions). And then, we compared % uncovered struts on OCT, calculated as percent ratio of uncovered struts to total struts in all cross-sections, among tertile groups. The highly uncovered lesions and the incompletely covered lesions were defined as the lesions with % uncovered struts ≥75th percentile (6.0%) and the lesions with the number of uncovered struts on OCT ≥1, respectively.
Results: Percent uncovered struts were significantly different among the tertile groups of LL (p<0.001). Angiographic LL significantly correlated with % uncovered struts (r=-0.340, p<0.001). The cut-off value of LL to predict the highly uncovered or the incompletely covered lesions were 0.29 mm



(AUC=0.723, p<0.001) and 0.61 mm (AUC=0.692, p<0.001), respectively.
Conclusions: This study demonstrated that there was a significant correlation between angiographic LL and % uncovered struts on OCT and a lesser LL siginificantly correlated with incomplete neointimal coverage of struts on OCT after DES implnatation.

TCT-59

Validation Study of an Automated Algorithm to Assess Stent Strut Apposition and Neointima Coverage of In-vivo Intra-Coronary Optical Coherence Tomography Images

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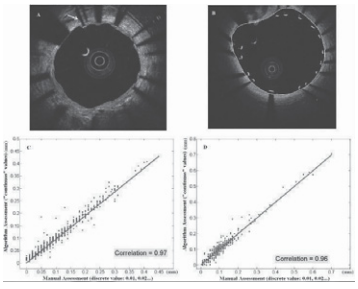
Background: Manual assessment of optical coherence tomography (OCT) images is very time consuming and labor intensive. We previously developed a fast and robust algorithm to provide an automatic quantification of stent strut apposition and coverage based on automatic analysis of intensity profiles in raw OCT images. The aim of the present study was to validate this automatic methodology against manual assessment.
Methods: 108 random frames from in-vivo OCT pullbacks were analyzed both manually by two different operators (LightLab workstation) and using the fully automatic approach. Comparison between both approaches was made using regression analysis and Bland Altman statistics.
Results: Compared to manual assessment, the algorithm operated with a very high Pearson's correlation index of 0.96 for stent strut apposition and 0.97 for strut coverage assessment. Bland Altman validation did not show significative bias and presented very good limits of agreement: 0.07 mm on a scale of 0.7 mm (10%) for apposition, 0.06 mm on a scale of 0.4 mm (15%) for coverage. Results between the two operators presented a correlation index of 0.97 in both cases. Bland Altman statistics limits of agreement were 0.06 mm on a scale of 0.7mm (8.5%) for apposition, and 0.06 mm on a scale of 0.4 mm (15%) for coverage. Automatic analysis required an average time of 5 seconds per frame, compared to 3 to 5 minutes for the manual assessment.
Figure: Automated analysis of stent strut coverage (A) and apposition (B). Also very small struts (arrows) were correctly identified. Correlation of the automated analysis versus manual assessment for strut coverage (C) and apposition (D).



Conclusion: The present study indicates that the currently developed algorithm is a robust automated tool able to assess apposition and coverage of stent struts from in-vivo OCT pullback frames in a very fast and reliable way.